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ADHESION OF STAPHYLOCOCCUS AUREUS ON VARIOUS BIOMATERIAL SURFACES

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At present, it is believed that 60 to 80% of infections that humans encounter after implantation are related to the formation of biofilms. Biofilm-related infections are usually chronic, often life-threatening, and biofilm-forming bacteria are particularly resistant to antibiotics and human immune mechanisms. The formation of a biofilm is a multi-stage process, conditioned on the one hand by the properties of the microorganisms that make it up, and on the other hand by the structure and properties of the colonized materials, or the colonized host, which may be another living organism. Reducing the risk of biofilm development on the surface of biomaterials is one of the primary goals of researchers looking for effective strategies to prevent biofilm-related infections. The main approaches involve modifying the surface of materials to reduce microbial adhesion and interfere with the initial stages of biofilm development. Therefore, as part of the work, it was proposed to apply the ZnO antibacterial layer on the substrate made of Ti6Al7Nb alloy by the ALD method. To evaluate the suitability of the proposed surface modification, studies of electrochemical properties were carried out, as part of which potentiodynamic studies and studies using electrochemical impedance spectroscopy were carried out. In addition, biological studies were performed with the reference bacteria Staphylococcus aureus (ATCC 25923). On the basis of the conducted research, different numbers of bacterial colonies adhered to the tested surfaces were found depending on the variant of surface modification used. A similar tendency was observed in the case of studies of electrochemical properties.

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